ANNUAL COMPLIANCE REPORT

Compliance Status of Public Water Supplies
in the
State of Montana
for
Calendar Year 2002

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I. INTRODUCTION

In 1974, Congress passed the Safe Drinking Water Act (SDWA), the first national legislation regarding drinking water. The act required the U.S. Environmental Protection Agency (EPA) to adopt regulations to establish minimum requirements for drinking water quality and treatment. Public water supplies must meet these requirements before water can be served to the public for consumption. The act also required owners of public water supplies to notify their customers when violations of the regulations occur.

In response to growing concern over contamination of drinking water, Congress amended the SDWA in 1986 to significantly increase monitoring and treatment requirements. Although the 1986 amendments resolved many shortcomings in the original legislation, it became apparent that additional revisions were needed to better prioritize and address health risks associated with drinking water. The SDWA was subsequently amended again in August of 1996.

Included in the 1996 amendments was a requirement that states prepare annual compliance report (ACRs) that describe the status of compliance of public water supplies with the SDWA. In Montana, the Department of Environmental Quality (DEQ) implements the requirements of the SDWA under an agreement with EPA. The Public Water Supply (PWS) Section in DEQ regulates approximately 2,013 public water supplies in Montana. DEQ has completed the ACR for calendar year 2002 that describes the status of compliance with the SDWA in Montana. The report lists and explains the number of violations of the requirements of the SDWA according to whether the violation was related to a drinking water standard, a water treatment requirement, or a water quality monitoring/reporting requirement. Violations are further listed according to the rule violated.

Questions may be addressed to the Public Water Supply Section at the address or phone number on the title page of this document.

II. PUBLIC WATER SUPPLIES IN MONTANA

The SDWA defines a public water supply as one that provides drinking water to at least 15 service connections or serves at least 25 people for at least 60 days of the calendar year. Three types of public water supplies are regulated by DEQ as required by the SDWA: (1) community supplies (those that serve the same resident population every day such as cities, towns, subdivisions and trailer courts); (2) nontransient noncommunity supplies (those that serve the same nonresident population for at least 6 months of the calendar year such as schools and places of business); and (3) transient noncommunity supplies (those that serve a transient population such as restaurants, campgrounds and taverns). There are about 667 community supplies, 227 nontransient noncommunity supplies, and 1,119 transient noncommunity supplies in Montana. They serve drinking water to as many as 898,807 people daily.

Since 1967, the Montana Water and Wastewater Operator Certification Law has required that every community public water supply retain at least one individual that is fully certified according to state regulations. Similar requirements apply to operators of public wastewater treatment systems. The law was amended by the 1997 Montana Legislature to require that operators of nontransient noncommunity public water supplies also be certified beginning in July of 1998. Montana's water and wastewater system operators must have appropriate experience, pass specialized examinations, and obtain continuing education credits in order to remain fully certified.

III. DRINKING WATER QUALITY IN MONTANA

Most Montana residents are privileged to have safe, palatable drinking water. Many springs, wells, streams and lakes used to supply drinking water to the public receive flow from naturally protected mountain watersheds. Surface water and groundwater sources are further protected against significant degradation by federal or state laws. Some surface water sources serving the public are so pristine that disinfection is the only required treatment prior to consumption. Most groundwater sources are naturally protected against contamination and used without treatment.

Because most contaminants in drinking water cannot be detected by sight or smell, owners of public water supplies regularly submit water samples for extensive testing by certified laboratories. Treatment is required when natural or man-made contaminants are detected in water samples, or when sources are not adequately protected by natural barriers.

Since the original SDWA was passed in 1974, the quality of drinking water has improved dramatically in Montana and across the United States. Increasing awareness of water contamination and the associated health effects has often focused the public's attention on drinking water. The 1986 and 1996 amendments to the SDWA have required increasingly stringent monitoring and treatment of drinking water supplied to the public. As a result, Montana residents are supplied with drinking water from public water supplies that is much safer than when the original SDWA was passed in 1974.

Contaminants found in drinking water. Contaminants found in drinking water can be grouped into four general categories:

> (1) Microbiological contaminants are primarily disease-causing microorganisms, or microorganisms that indicate that other disease-causing organisms are present. Certain viruses, bacteria and protozoa are disease-causing organisms that can be transmitted to humans from contaminated drinking water. Although such problems are relatively rare, serious water-borne disease outbreaks still occur in the United States from improper disposal of human or animal wastes and from inadequate treatment of drinking water. All public water supplies must sample regularly for coliform bacteria. Although coliform bacteria are not always a health risk, their presence in drinking water indicates that disease-causing microorganisms may be present. Surface water sources must be carefully treated before they can be used for human consumption. Some groundwater

sources are also treated for microbiological contaminants because they have been compromised by a lack of natural protection or by improper disposal of human or animal wastes.

(2) Inorganic chemicals (IOCs) are chemicals that contain no carbon. Examples of regulated IOCs are arsenic, fluoride, lead and nitrate. Inorganic contaminants can cause a wide variety of health effects depending upon the contaminant, the concentration and the length of exposure. Potential health effects include toxic (poisonous) effects and cancer. High nitrate levels in drinking water can impair the transfer of oxygen to the blood in infants. High lead levels can impair intellectual development in children. Most of the inorganic MCL violations in Montana are fluoride and nitrate violations.

(3) Organic chemicals contain carbon. Organic chemicals are grouped into two broad categories: volatile organic chemicals (VOCs) and synthetic organic chemicals (SOCs). VOCs are more volatile than SOCs; i.e., they could be removed from water simply by aerating or heating the water. Examples of VOCs are solvents like perchloroethylene, toluene and xylene. SOCs must typically be removed by more complex technologies involving filtration or adsorption. Examples of SOCs are insecticides, herbicides and polychlorinated bi-phenyls (PCBs). Organic contaminants can cause a wide variety of health effects depending upon the contaminant, the concentration, and the length of exposure. Potential health effects include toxic (poisonous) effects and cancer. Fortunately, very few MCL violations for VOCs and SOCs have been found in Montana.

(4) Radionuclides are usually naturally occurring, like radium. Radionuclides in drinking water can cause cancer or toxic effects, again depending upon the concentration and time of exposure. There are no current MCL violations for radionuclides in Montana.

Surface water supplies. The most dramatic improvements in the treatment of drinking water since 1974 have been in the filtration and disinfection of surface water. Surface water is generally more susceptible to contamination than groundwater. Many surface water sources have historically been inadequately treated because of a lack of awareness regarding water-borne diseases, chemical contaminants and the health effects associated with these contaminants. In response to outbreaks of water-borne disease, such as giardiasis and cryptosporidiosis, knowledge and technology related to treatment of surface water have been greatly enhanced.

The primary objective in treating surface water is to remove or inactivate microbiological contaminants that can cause disease, i.e. viruses, bacteria and protozoa. Diseases can be transmitted to humans by consuming water that has been contaminated with animal or human wastes. Adequate treatment of microbiological contaminants is essential because they can cause acute health effects. People with compromised immune systems, such as infants, the elderly, the very ill and HIV-positive individuals, may be especially vulnerable to water-borne disease.

There are 225 public water supplies in Montana that use surface water as a primary or secondary source. Although relatively few in number, the largest public water supplies in Montana use surface water and they serve as many as 400,226 people on a daily basis.

Groundwater supplies. Regular, prescriptive sampling of groundwater sources serving the public in Montana has occasionally detected unacceptable levels of microbiological, inorganic, organic and radiological contaminants. Unfortunately, natural purification of contaminated groundwater is usually much slower than surface water. Natural "flushing" of contaminants through a groundwater aquifer can take many tens or hundreds of years. Microbiological contaminants can enter groundwater from leaking sewers and poorly constructed sewage lagoons or septic systems. Some inorganic and radiological contaminants, e.g. arsenic and radium, are naturally occurring. Most organic contaminants, e.g. solvents and pesticides, are man-made. Organic contaminants that are found in groundwater are usually the result of improper use or disposal of chemicals.

Most public water supplies in Montana utilize groundwater as a primary or secondary source. There are 1,788 public water supplies in Montana that utilizes groundwater as a primary or secondary source. These groundwater sources serve as many as 498,581 people on a daily basis.

IV. REGULATIONS AND ENFORCEMENT

EPA and DEQ regulations regarding water quality monitoring and water treatment have become very comprehensive and complex. Most water supply owners are willing to comply, but are sometimes confused by the complex nature of the regulations. Since 1989, monitoring and treatment requirements have increased significantly. In 1993, several regulations became effective that imposed complex new requirements almost simultaneously. Many monitoring violations resulted, often simply from a lack of understanding of the regulations. In 2002, a few more regulations became effective, imposing even more requirements upon water suppliers.

When contaminants are detected at unacceptable levels, or when water treatment methods are found to be inadequate, owners of public water supplies are required to notify the public. Appropriate corrective action is then required by DEQ to treat or abandon the affected water source(s). The public must also be notified when water samples are not taken as required.

When possible, PWS Section staff or DEQ contractors resolve violations informally with the water supply. This may involve phone calls, field visits or on-site technical assistance. Technical assistance is also often provided by Montana Rural Water Systems or the Midwest Assistance Program. Most violations are resolved informally by the willing cooperation of the water supply. When violations are difficult to resolve, DEQ may initiate formal enforcement actions such as administrative orders to ensure public health protection.

Most water supplies are in substantial compliance with the regulations. The most frequent violations resulted from late or missed water samples. The most significant public water supply violations in 2002 are regarded as those resulting from inadequately treated surface water, coliform bacteria contamination, and corrosive water conditions that accelerate the leaching of lead from solder in home plumbing.

All community water supplies are required to provide a consumer confidence report to the State and its users by July 1 of each year. These reports contain water supply data for the previous calendar year. The information is to reflect general supply logistics; any maximum contaminant levels (MCLs), exceedances or contaminant detections; variances or exemptions; violations incurred; compliance actions taken; system updating (e.g., to treatment plants or service lines); and information on how to stay aware of their drinking water.

V. VIOLATIONS IN 2002

Section 1413 of the amended SDWA requires states to prepare ACRs for public water supplies. The first ACR was prepared for calendar year 1996. Subsequent ACRs are due annually on July 1. Included in the report are the following types of violations of national primary drinking water regulations:

1. **Maximum contaminant levels (MCLs).** MCLs are maximum levels of contaminants that may be present in drinking water. Drinking water that contains contaminants at levels below the MCLs is regarded as safe for human consumption.

2. **Treatment requirements.** Treatment requirements are imposed when MCLs are exceeded, or when natural protection against contamination is inadequate to ensure safe drinking water without treatment.

3. **Variances and exemptions.** Variances may be issued by DEQ when treatment has been installed, but has not been effective in meeting MCLs. Variances impose further requirements for meeting the MCL, or for installing alternative treatment. Exemptions are issued to simply allow additional time to meet an MCL or treatment requirement. DEQ must consider public health impacts and affordability when variances and exemptions are issued. In addition to imposing deadlines for making system improvements, variances and exemptions impose requirements for public notification. No violations of variances or exemptions were recorded in 2002.

4. **Monitoring requirements.** As previously discussed, new regulatory requirements include extensive water sampling and testing requirements. Violations are created when water is not sampled or when results of tests are not submitted. Most monitoring violations are resolved when sampling is resumed and public notice is posted, or when late reports are submitted.

5. **Reporting requirements.** All community water supplies are required to provide a consumer confidence report to the State and its users each year. The supplier remains in violation until the report is appropriately distributed.

Tables have been prepared that include the above violation information for the specific regulations adopted by EPA. These regulations are the Phase 2 and Phase 5 (Phase 2/5) Rules, the Total Coliform Rule (TCR), the Surface Water Treatment Rule (SWTR), the Disinfection Byproducts Rule (DBP), the Lead and Copper Rule (LCR), the Radionuclides Rule, and the Consumer Confidence Report Rule.

PHASE 2/5 RULE

Table 1 shows the violations of MCLs and monitoring requirements for synthetic organic chemicals (SOCs), volatile organic chemicals (VOCs), inorganic chemicals (IOCs), and for nitrate/nitrite in calendar year 2002. Monitoring frequency for VOCs, IOCs, SOCs, and nitrates/nitrites for community and nontransient noncommunity public water supplies varied widely in calendar year 2002. Owners of all public water supplies were required to sample for nitrate in 2002.

Three supplies violated the MCL for nitrate. Most of these violations are associated with naturally occurring contaminants, but some of the nitrate violations may be the result of contamination from improper sewage disposal or agricultural practices. There was one supply with an MCL violation for SOCs, and one for IOCs. There were no violations of the MCLs for VOCs.

Eight water suppliers were in violation of the monitoring requirements for VOCs, none for SOCs, one for IOCs, and 157 for nitrate. VOC and IOC monitoring violations included monitoring requirements due by the end of calendar year 2002. Monitoring violations resulted from late samples, missed samples, improper sampling procedures, or confusion over complex monitoring requirements. Most of the nitrate monitoring violations were simply a failure to mail the sample results to DEQ.

Table 1. Violations of the Phase 2 and Phase 5 Rules

SDWIS Codes	**Phase II and Phase V**	MCL (mg/l)	MCLs		Treatment Techniques		Significant Monitoring/Reporting	
			Number Of Violations	Number Of Systems With Violations	Number Of Violations	Number Of Systems With Violations	Number Of Violations	Number Of Systems With Violations
	VOCs		0	0			9	8
	SOCs		1	1			0	0
	IOCs		1	1			1	1
	NO_3/NO_2	10	3	3			176	157
	Subtotal		5	5			180	166

TOTAL COLIFORM RULE

Table 2 shows the violations of the MCLs and monitoring requirements for TCR. There were 157 public water supplies that exceeded the Maximum Contaminant Level (MCL violations) for total coliform in 2002. Twenty-three MCL violations resulted when a routine or one of the repeat samples showed the presence of fecal coliform bacteria. Fecal coliforms are a specific subgroup of total coliforms which grow only at body temperature of warm-blood animals. They are used to indicate if fecal contamination of water is more likely to have recently occurred.

There are two types of TCR MCL violations: (1) a Boil Water Order is an acute MCL violation and is issued if there is coliform bacteria with fecal contamination, and (2) a Health Advisory is a non-acute MCL violation that is issued when a system has coliform bacteria but there is no fecal contamination. The MCLs are based on a system's routine and repeat samples. Improper sampling, improper disinfection of water systems following construction, inadequately protecting water sources, or growths of bacteria that can exist within the distribution system are common reasons for these MCLs.

Eight hundred and one water supplies were in violation of the routine monitoring requirements in 2002. The violations that occurred resulted from systems not submitting monthly or quarterly samples.

Table 2. Violations of the Total Coliform Rule

SDWIS Codes	**Total Coliform Rule**	MCL	MCLs		Treatment Techniques		Significant Monitoring/Reporting	
			Number Of Violations	Number Of Systems With Violations	Number Of Violations	Number Of Systems With Violations	Number Of Violations	Number Of Systems With Violations
21	Acute MCL Violation	Present	23	19				
22	Non-Acute MCL Violation	Present	196	138				
23, 24	Major routine and follow up monitoring						801	444
	Subtotal		219	157			801	444

SURFACE WATER TREATMENT RULE

Table 3 shows the violations of the treatment technique requirements (filtration and disinfection) and of the monitoring requirements of the SWTR. Four water supplies failed to meet treatment technique requirements at all times, and one failed to install filtration treatment as required by DEQ. Treatment technique violations are typically the result of inadequate filtration or disinfection when water quality or water demands are extreme. Most of the water supply owners that failed to install filtration equipment experienced difficulty in securing funding for the necessary improvements, or have experienced delays in design or construction work. DEQ has four outstanding administrative orders with compliance schedules issued prior to 2002 to unfiltered system owners requiring them to install filtration treatment.

Seven suppliers failed to monitor treatment processes and water quality as required. Most of these supplies are very small water systems.

Table 3. Violations of the Surface Water Treatment Rule

SDWIS Codes	**Surface Water Treatment Rule**	MCL	MCLs		Treatment Techniques		Significant Monitoring/Reporting	
			Number Of Violations	Number Of Systems With Violations	Number Of Violations	Number Of Systems With Violations	Number Of Violations	Number Of Systems With Violations
	Filtered Systems							
36	Monitoring, Routine/Repeat						2	2
41	Treatment Techniques				4	4		
	Unfiltered Systems							
01	Turbidity MCL Single						8	1
02	Turbidity MCL Average						0	0
03	Turbidity Significant M/R						0	0
31	Monitoring, Routine/Repeat						16	4
42	Failure To Filter				1	1		
	Subtotal				5	5	26	7

DISINFECTION BYPRODUCTS RULE

Stage 1 Disinfections Byproducts Rule went into effect on January 1, 2002 for surface water systems and ground water systems under the direct influence of surface water serving equal to or greater than 10,000 people. There are currently six systems monitoring under this rule. Five were granted reduced monitoring in 2002. One water supplier received a failure to monitor violation, and immediately returned to compliance during 2002.

Surface water systems and ground water systems under the direct influence of surface water serving less than 10,000 people, and all ground water systems, must comply with this rule effective January 1, 2004.

Table 4. Violations of the Disinfection Byproducts Rule

SDWIS Codes	**Disinfection Byproducts Rule**	MCL	MCLs		Treatment Techniques		Significant Monitoring/Reporting	
			Number Of Violations	Number Of Systems With Violations	Number Of Violations	Number Of Systems With Violations	Number Of Violations	Number Of Systems With Violations
27	Monitoring, Routine/Repeat						1	1
11	Chlorine (0999) or Chloramines (1006) MRDL	4.0 mg/l	0	0				
11	Chlorine Dioxide M&R						0	0
02	DBP MCL Average (Total TTHMs. 2950)	0.50 ug/l	0	0				
02	DBP MCL Average (Total HAA5s, 2456)	0.10 ug/l	0	0				
	Subtotal		0	0			1	1

LEAD AND COPPER RULE

Table 5 shows monitoring and treatment technique violations of the LCR. Sixty water suppliers violated the treatment technique requirements in 2002. Most of these suppliers failed to install treatment because of uncertainties regarding appropriate treatment chemicals and/or treatment methods. Each water source is unique, and the appropriate corrosion control chemical or method must be selected carefully.

Seventy-nine water suppliers violated the LCR monitoring requirements in 2002. Most of the violations resulted from late or missed samples, or from confusion over complex monitoring requirements. Thirty-one suppliers failed to provide required educational materials to the public regarding lead exceedances, or failed to notify DEQ that they had provided the required public education materials.

Table 5. Violations of the Lead and Copper Rule

SDWIS Codes	**Lead and Copper Rule**	MCL	MCLs		Treatment Techniques		Significant Monitoring/Reporting	
			Number Of Violations	Number Of Systems With Violations	Number Of Violations	Number Of Systems With Violations	Number Of Violations	Number Of Systems With Violations
51	Initial lead and copper tap M/R						80	46
52	Follow-up or routine lead and copper tap M/R						33	33
58, 62	Treatment Installation				29	29		
65	Public Education				31	31		
	Subtotal				60	60	113	79

RADIONUCLIDES RULE

Only community water supplies must sample for radionuclides every four years until changes to the rule take effect on December 7, 2003. At that time schedules will be adjusted accordingly to three, six, or nine-year compliance periods based on the historical data and/or the results received during the initial monitoring period. Five water suppliers exceeded the MCL and were placed on quarterly monitoring during calendar year 2002. Three are close to returning to compliance, with the remaining two progressing toward compliance as outlined in the Radionuclides Rule. No MCL violations were issued for calendar year 2002.

Table 6. Violations of the Radionuclides Rule

SDWIS Codes	**Radionuclide MCLs**	MCL (pci/l)	MCLs		Treatment Techniques		Significant Monitoring/Reporting	
			Number Of Violations	Number Of Systems With Violations	Number Of Violations	Number Of Systems With Violations	Number Of Violations	Number Of Systems With Violations
4000	Gross Alpha	15 pCi/l	0	0			0	0
	SUBTOTAL		0	0			0	0

CONSUMER CONFIDENCE REPORT RULE

Only community water supplies must comply with the Consumer Confidence Report Rule. Twenty-nine suppliers did not meet the requirements of this rule in 2002. Ten of these 29 suppliers incurred a Consumer Confidence Report violation the previous year.

Table 7. Violations of the Consumer Confidence Report Rule

SDWIS Codes	**Consumer Confidence Report Rule**	MCL (pci/l)	MCLs		Treatment Techniques		Significant Monitoring/Reporting	
			Number Of Violations	Number Of Systems With Violations	Number Of Violations	Number Of Systems With Violations	Number Of Violations	Number Of Systems With Violations
71	Consumer Notification						29	29
	SUBTOTAL						29	29

VI. SUMMARY and CONCLUSIONS

A significant portion of the violations were a result of an incomplete understanding of the requirements, or were technical violations that did not result in public health risks. However, more attention must be devoted to reducing the number of violations.

The Public Water Supply Section in DEQ continuously coordinates efforts with owners of public water supplies to address the most significant violations. The most serious public health risks receive the highest priority. Water suppliers are notified by DEQ when violations occur, and are informed of corrective measures necessary to return to compliance. Several water suppliers have recently installed new surface water filtration plants, and others will begin construction soon or are under compliance schedules to make system improvements. The PWS Section works with DEQ's Enforcement Division when necessary to return difficult violators to compliance through formal enforcement actions. Questions may be directed to the PWS Section at the mailing address or phone number shown on the cover page of this document.

The Planning and Prevention Division at DEQ implemented a new program in 1997 to make low interest loans to owners in need of water system improvements. Many suppliers have taken advantage of this funding program, and it is anticipated that many noncompliance issues will be addressed using these loans. Questions regarding this program may be directed to the Technical and Financial Assistance Bureau, Planning and Prevention Division, DEQ, P.O. Box 200901, Helena, MT 59620-0901, phone (406) 444-6697.